

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings.

**Listing of Claims:**

1. (Previously presented) A cyclonic plasma pyrolysis/vitrification system pyrolyzing and vitrifying waste materials into exhaust gas and slag using a plasma torch, the system comprising:
  - a main reactor having a waste inlet supplying waste materials,
  - an exhaust gas outlet for discharging exhaust gas, and
  - a slag outlet for discharging slag;
  - a plasma torch inclined at a predetermined angle with respect to the internal bottom surface of the main reactor to induce a cyclonic gas flow which rotates about an essentially horizontal axis above the bottom surface of the main reactor for, pyrolyzing and vitrifying the waste materials in the main reactor;
  - a gas burner arranged with the plasma torch to direct a flame into the main reactor in manner to promote heating of the main reactor;
  - an auxiliary reactor connected to the exhaust gas outlet of the main reactor, for discharging exhaust gas;
  - a slag discharger connected to the slag outlet of the main reactor, for discharging the slag;
  - wherein the plasma torch circulates the gas in the main reactor and subjects flyashes contained in the circulating exhaust gas to be to centrifugal force, causing the flyash to melt and to be absorbed into molten waste materials on both inner walls and the bottom surface of the main reactor.
2. (Original) The cyclonic plasma pyrolysis/vitrification system of claim 1 wherein the slag discharger is formed just under the plasma torch.
3. (Previously presented) The cyclonic plasma pyrolysis/vitrification system of claim 1, including the waste inlet located in a side wall of the main reactor and located to deliver waste

material essentially horizontally into the cyclonic gas flow, and wherein the exhaust gas outlet opens into the main reactor a designated distance from the waste inlet, and wherein the main reactor has a downwardly extending separator wall of designated length formed therein.

4. (Previously presented) The cyclonic plasma pyrolysis/vitrification system of claim 1, wherein the exhaust gas outlet is disposed in essentially a center of an inner wall of the main reactor.

5. (Original) The cyclonic plasma pyrolysis/vitrification system of claim 1, wherein the plasma torch is inclined at the angle ranging from 20 to 40 degrees with respect to the bottom surface of the main reactor.

6. (Previously presented) The cyclonic plasma pyrolysis/vitrification system of claim 1, further comprising

an auxiliary chamber into which exhaust gas from the exhaust gas outlet is introduced;  
and

another gas burner disposed with the auxiliary chamber to circulate and heat the exhaust gas in the auxiliary chamber.

7. (Previously Presented) The cyclonic plasma pyrolysis/vitrification system of claim 3, wherein the downwardly extending separator wall is located between the cyclonic gas flow and the exhaust gas outlet.

8. (Previously Presented) The cyclonic plasma pyrolysis/vitrification system of claim 7, wherein the exhaust gas outlet is formed in a ceiling of the main reactor.